Education and Outreach. Educating our citizens and those with special health needs over the next 25 years.

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Where have we been?
Where are we now?
Where are we going?

How will we get to where we are going?

If we don't know our destination, how can we influence the process?

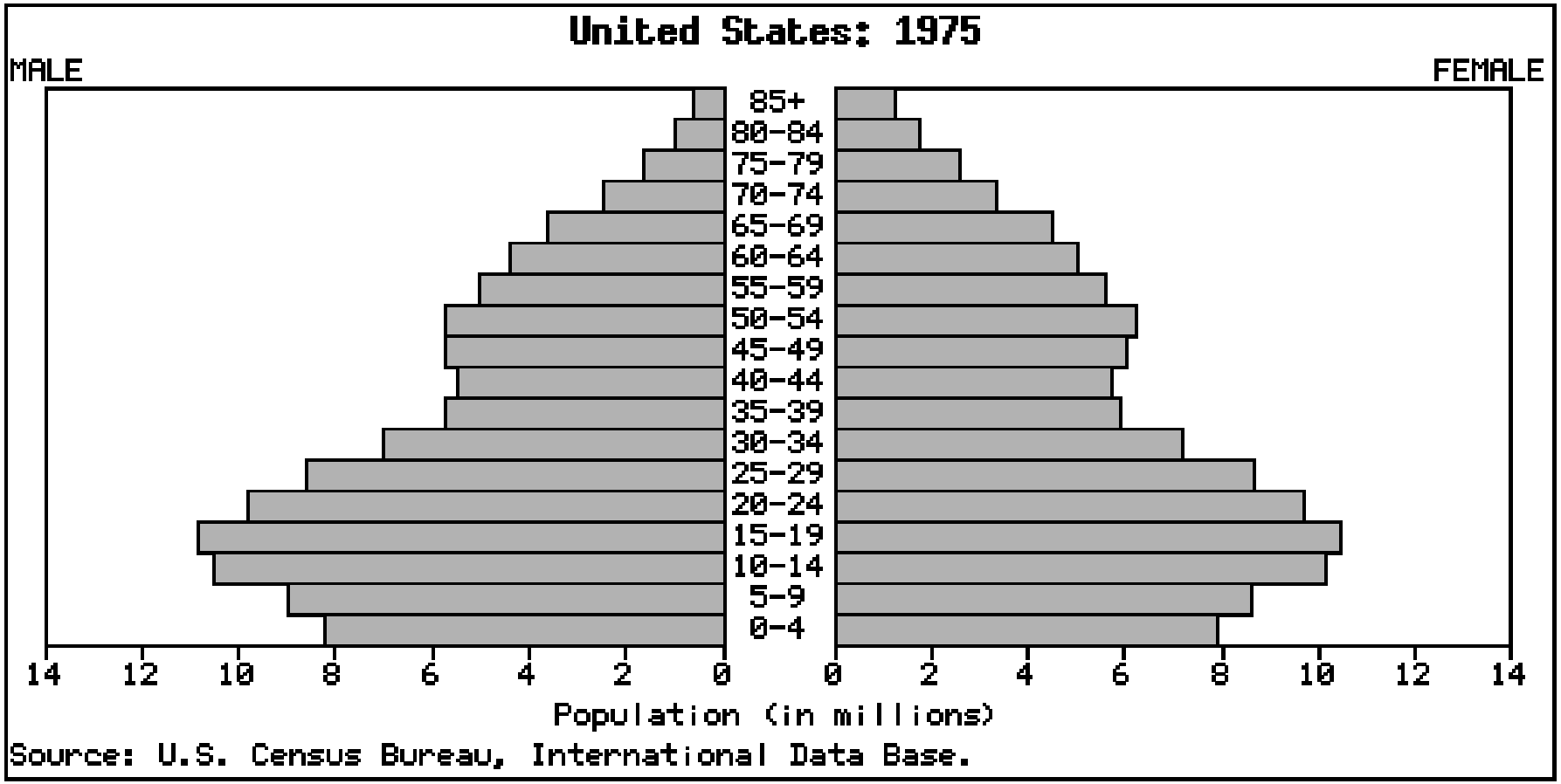
Taking on new roles at the EPA

- Consumer Confidence Reports (CCRs)
- Mandate for EPA to educate and inform the medical community about drinking water
- Increasing recognition within EPA of its importance as a public health agency

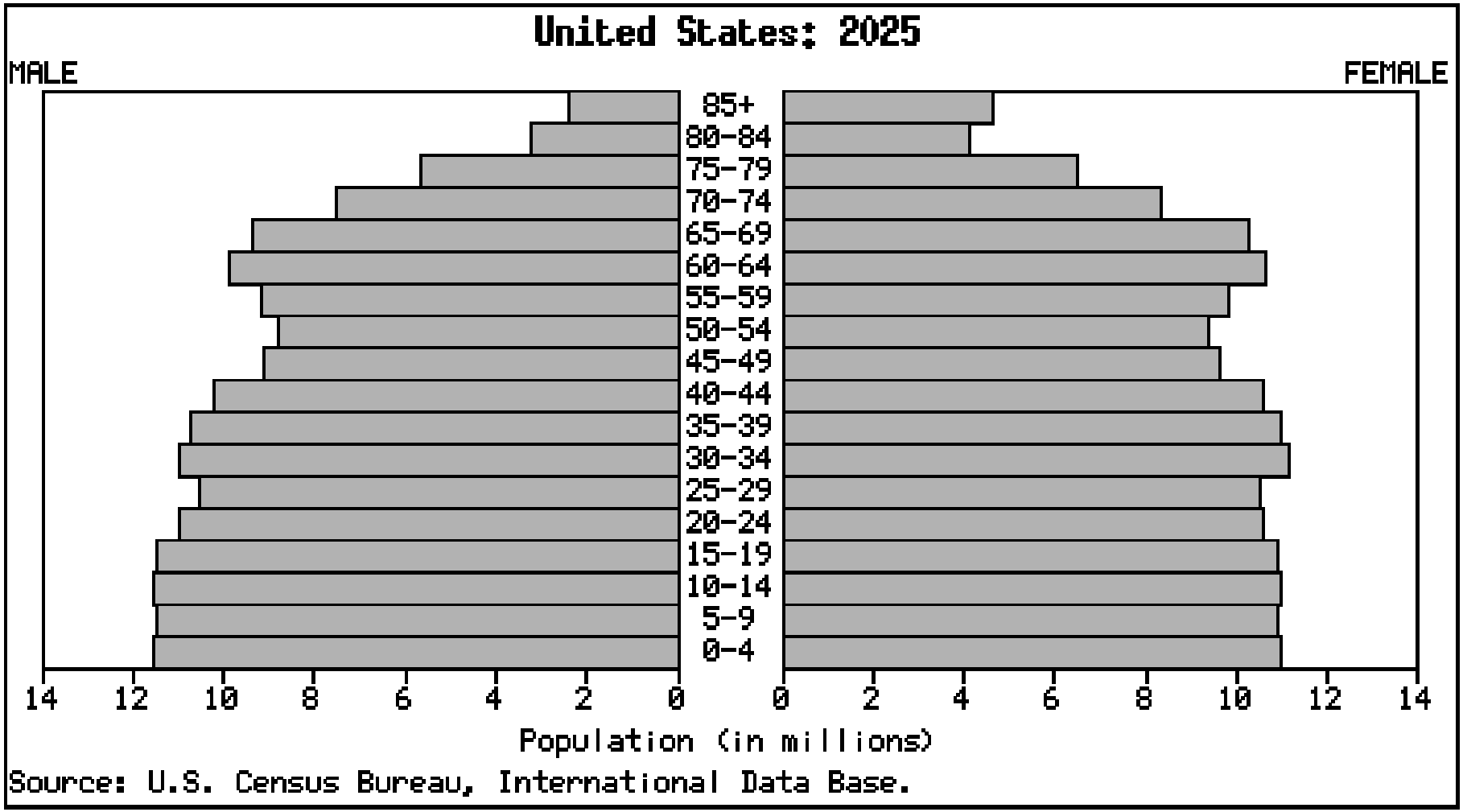
Demographics - Population Density and Aging

- 1900: 50 million in the USA
  1999: 274,000,000 (according to US Census)
- 1800: 98% of the world rural
  2000: 75% of US is urban
- 1995: 5 billion people in the world
  2050: 8 to 12 billion people

The US demographic picture in 1975

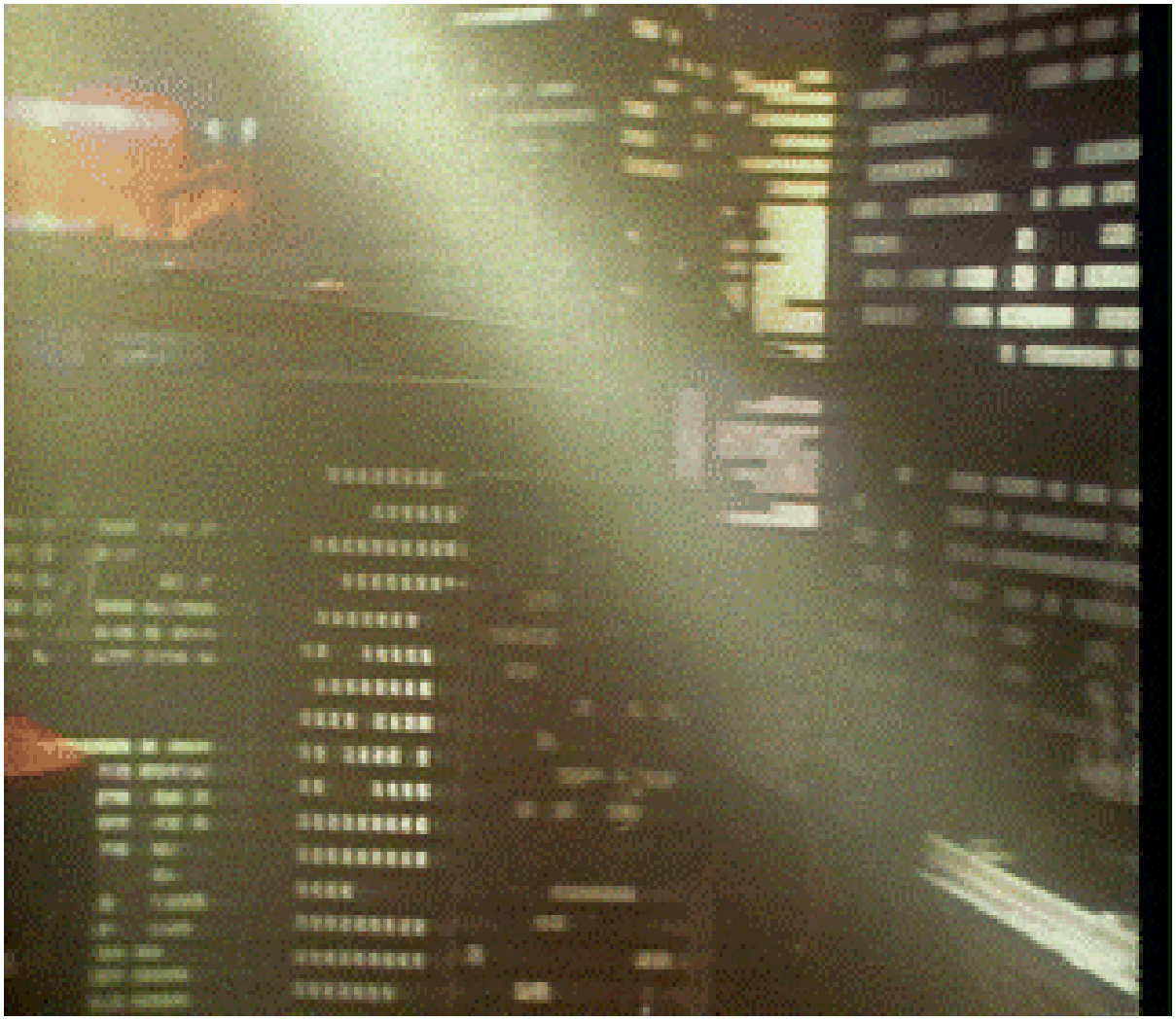


The US demographic picture in 2025



New York London Tokyo Mexico City Lagos Sao Paolo

Increasing population shifts to the East and West Coast, the South, Florida and California: Living in mega-cities that strain our abilities to provide safe drinking water




Disappearance of the small farm and local production; Agribusiness with megafarms; large scale pesticide use; Monoculture

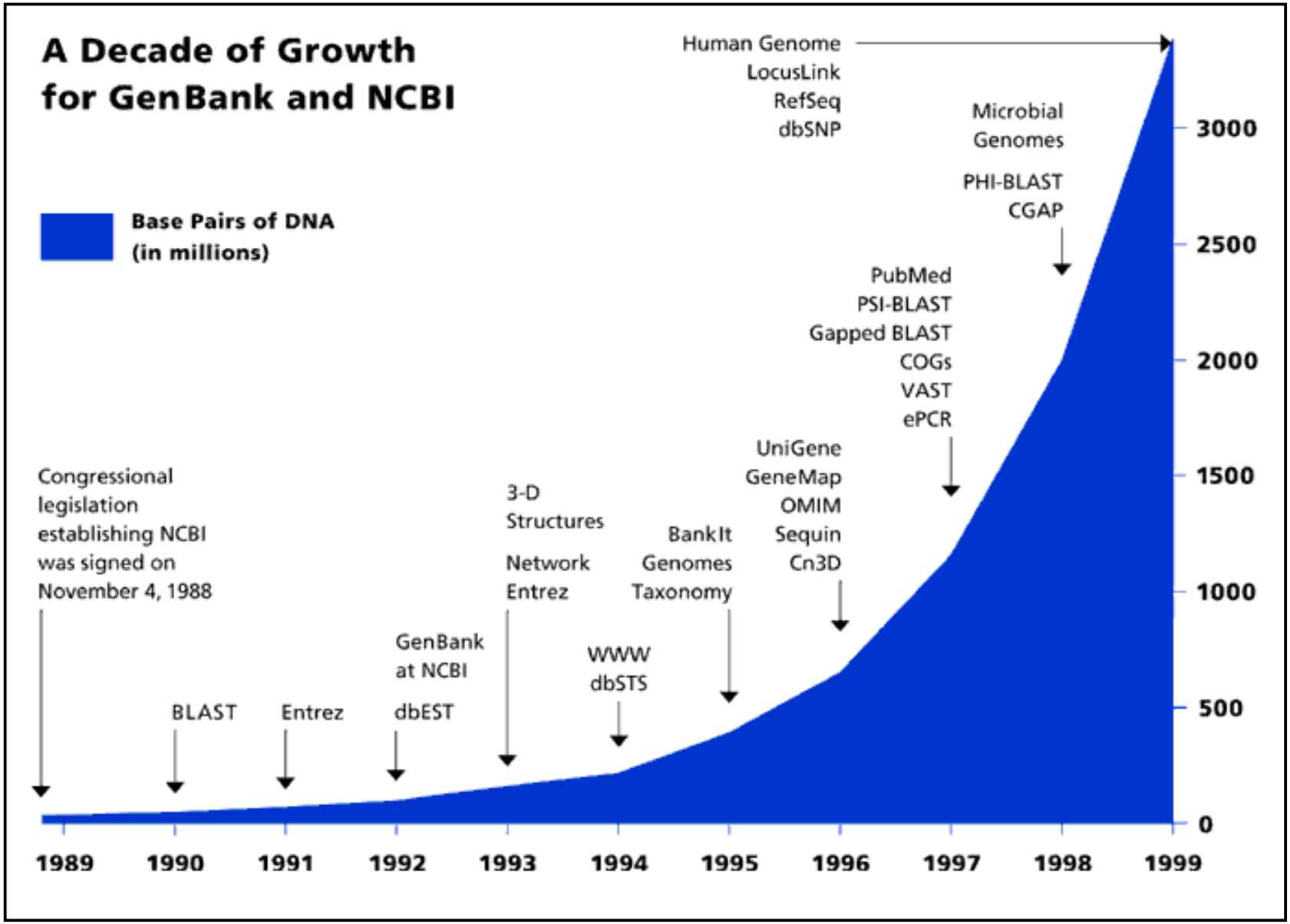
So, 25 years ago, a college classmate of mine...

Bill Gates

Technology shifts hard to predict

The internet: explosive growth

Dec 14 99 www.mymailstation.com



December 1999: An entire human chromosome sequenced

The figures on this pages are updated on the 1st of every month; last update 11/01/1999.

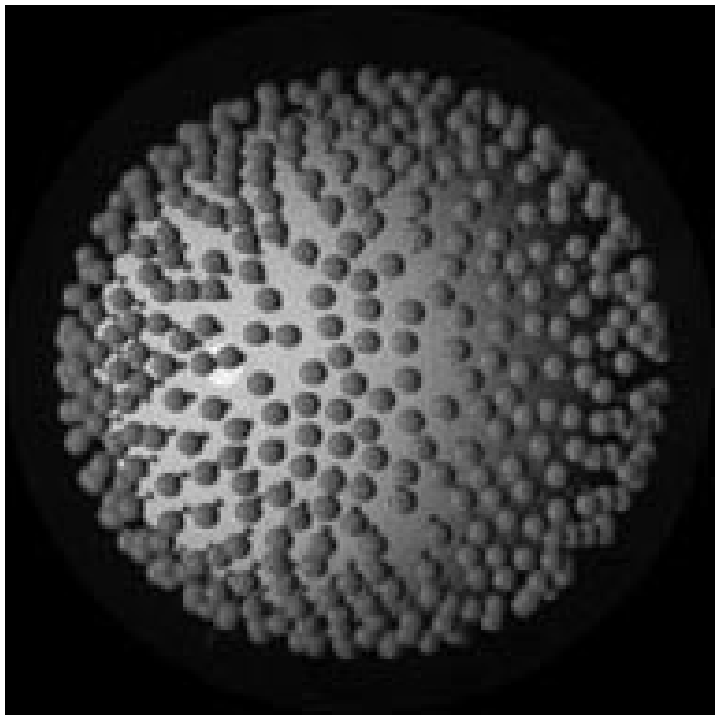
Species	1995*	1996	1997	1998	1999	Increase 5y	Increase 1 yr
all	16098	23183	32777	43411	58402	262%	39.00%
Viruses	1586	1871	2143	2391	2620	65%	10.50%
Bacteria	3086	4028	6310	8961	13774	346%	58.60%
Archaea	164	237	387	558	977	495%	89.70%
Eukaryota	10464	16032	22807	30144	39437	276%	35.50%

*Since the inception of the NCBI taxonomy database in March 1995.

www.ncbi.nlm.nih.gov

There is an explosion in our understanding of the genetic underpinning of form and function; it is inconceivable that this will not spill over into our understanding of risk and susceptibility.

Emerging Diseases



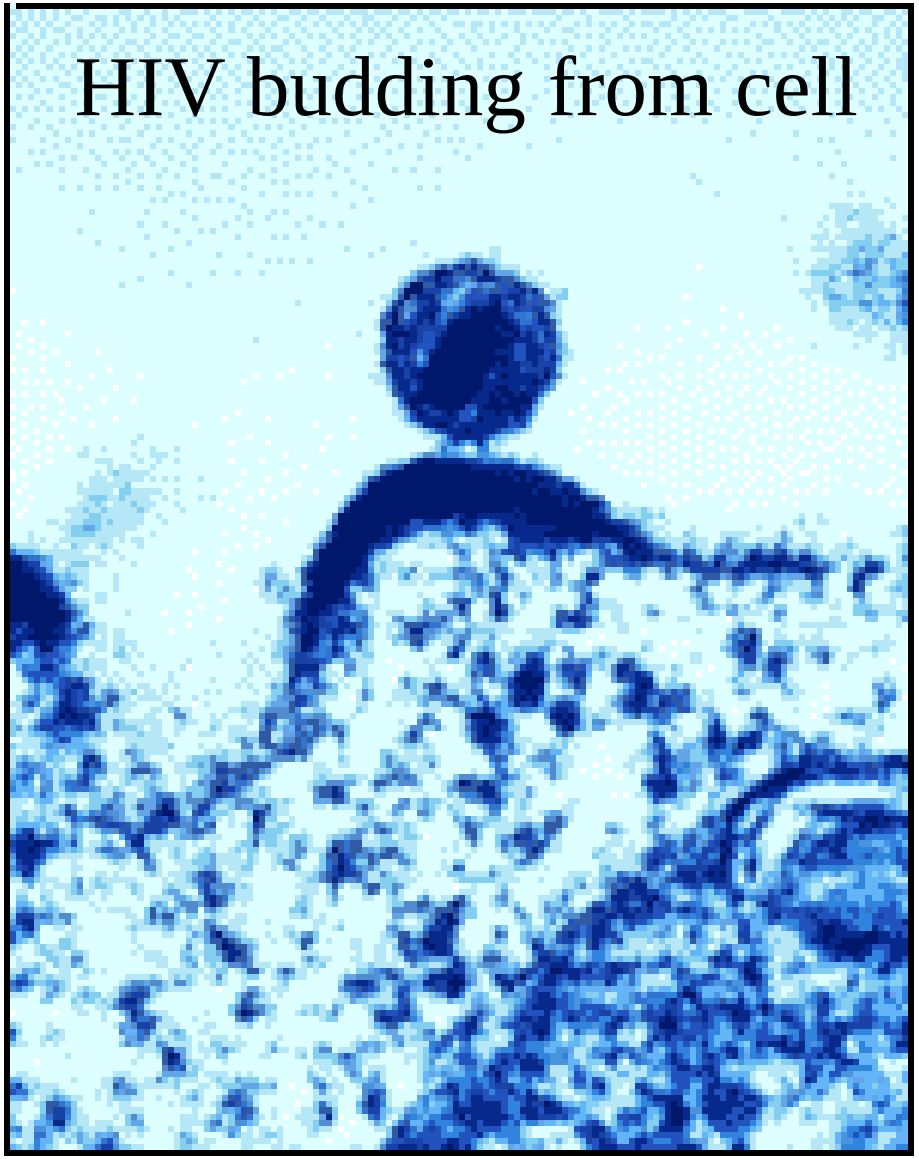
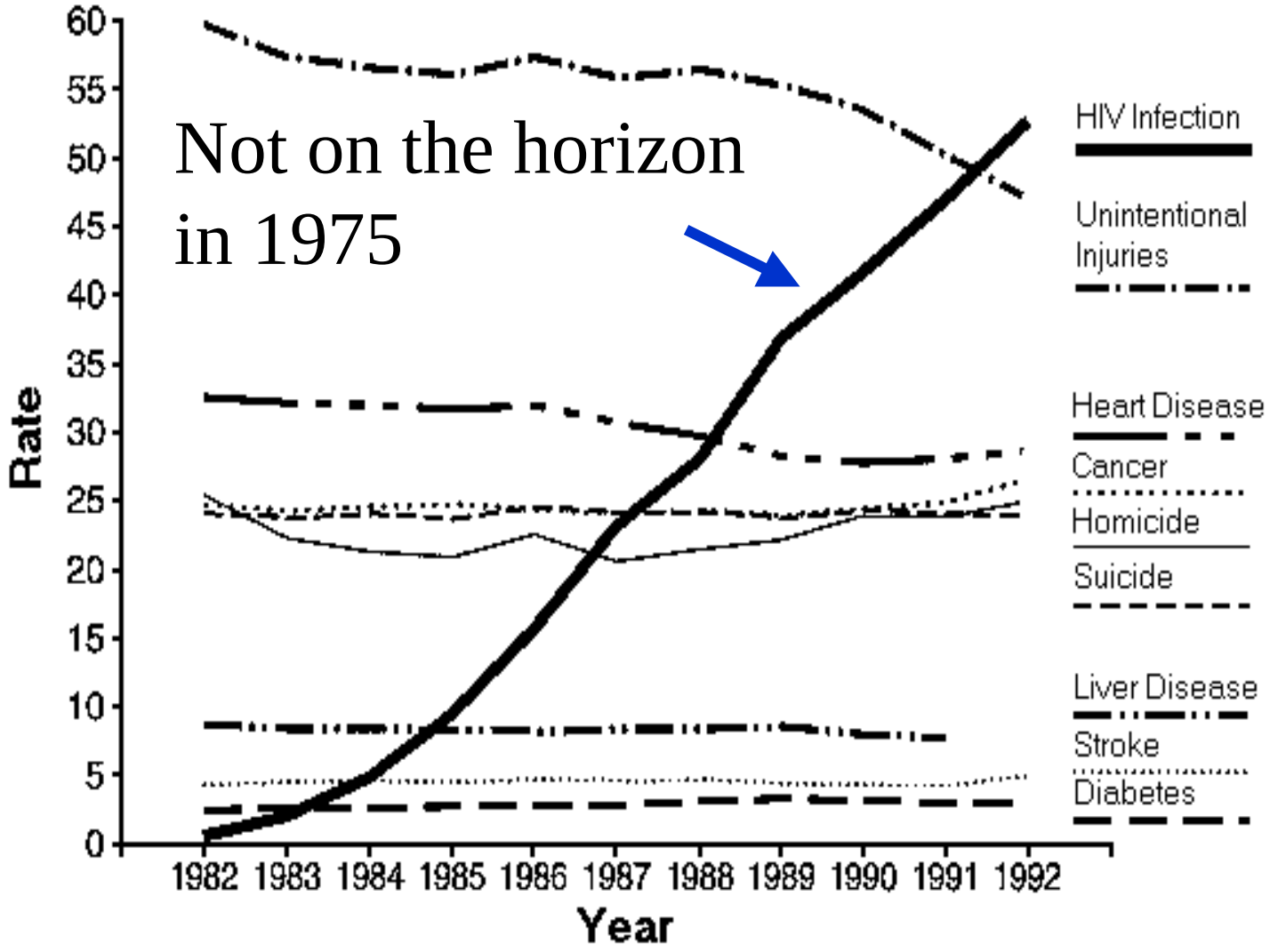


FIGURE 1. Death rates* from leading causes of death among men aged 25-44 years, by year – United States, 1982-1992+



* Per 100,000 population.
+ National vital statistics based on underlying cause of death, using final data for 1982-1991 and provisional data for 1992. Data for liver disease in 1992 are unavailable.

Cryptosporidium

- Protozoans such as Crypto are resistant to chlorination.
- If there are susceptible people in the served area, they are at extra risk.
- 1993 Milwaukee outbreak: 403,000 people sick, > 100 deaths, mostly people with AIDS.

Milwaukee Sentinel

Packer Plus

Free sample inside

THURSDAY MORNING APRIL 8, 1993

Boil water, mayor says

Safety of drinking supply probed in wake of mystery epidemic

PHARMACY/FOOD MART

WE HAVE IMODIUM A-D

OPEN EASTER

Bottled water buyers deluge stores

GOP budget boss warm to tax freeze 'adjustments'

Las Vegas 1994

1992: 2 cases *C. parvum*
1993: 23 cases
1994: 78 in 3 months

Chlorination system, and filtration, that are state-of-the-art and “the best in the USA.” No oocysts detected.

61/78: AIDS
32/61 dead by July 94
relative risk with CD4 < 100/mm^3 and drinking public water: 13.52

***Goldstein *et al*, Cryptosporidiosis: an outbreak associated with drinking water despite state-of-the-art water treatment. *Ann Intern Med* 124:459-469, 1996.**

Characteristics of Emerging Diseases:

- Resistance to chlorination.
- Resistance to antibiotics.
- Insular, or unique ecological niches.
- Zoonotic as well as human spread.
- A tiny inoculum can infect anyone.
- Severe clinical disease sometimes only in susceptible subpopulations.

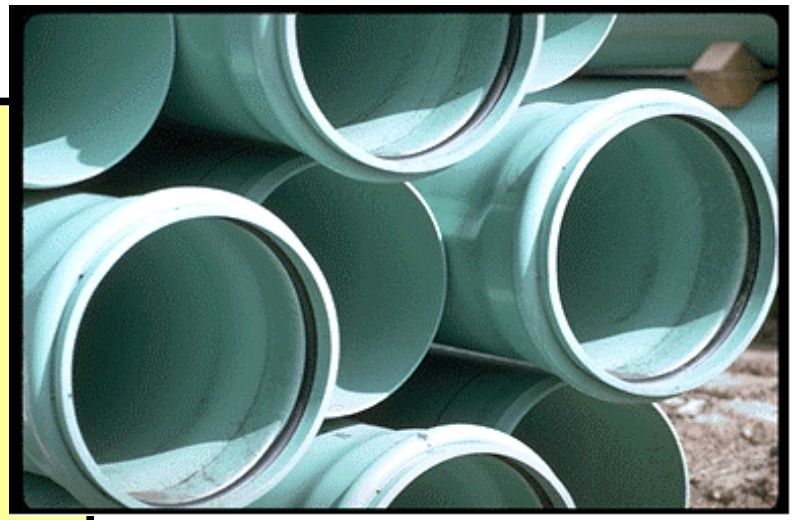
Then versus now: 1900 & 2000

- Typhoid
- nontyphoidal *Salmonella*
- Cholera
- Hepatitis A
- Polio and enteroviruses
- *E. coli*
- *Shigella*
- Chlorination sensitive
- Severe, easily detected - little uncertainty

- *Cryptosporidium*
- *Giardia*
- caliciviruses
- Microsporidia ?
- *M. avium-intracellulare* ?
- Chlorination resistant
- Often silent, hard to detect, therefore much uncertainty

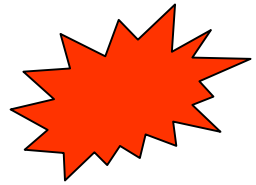
Growth of Environmentalism

Aging Infrastructure and New Demands on the Water System



- Distribution systems are a crucial part of the delivery process, and periodic replacement is under funded.
- As additional health concerns are identified, new treatment technologies are needed.
- Rural areas and small systems have tremendous capital needs

Forces



- We are growing older
- Growing numbers of ill people alive and functioning
- Cultural background shifting as population's composition changes
- Urban; increasing use of mechanized agriculture
- Emerging diseases
- Environmentalism
- Infrastructure needs

- Explosive growth in the Internet and the ability of people to obtain hard-to-find information.
- Explosive growth in our understanding of how our fates are determined by our genes.
- The end-points for many of these cannot be predicted now.

"Report to Consumers on Your Drinking Water"

Consumer Confidence Reports:

Education of the public about:

Sources of water

Quality of water

Safety of water

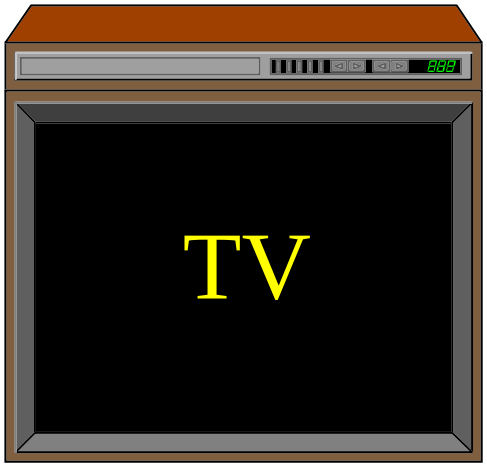
Potential and real risks of water contaminants

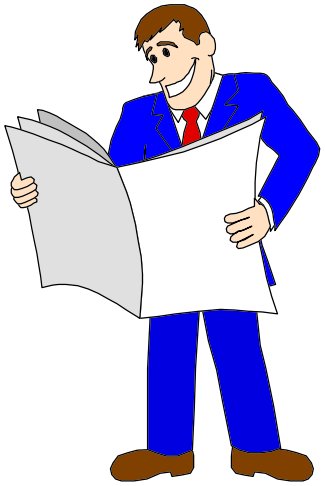
Specific advice for sensitive subpopulations

required by SDWAct 1996

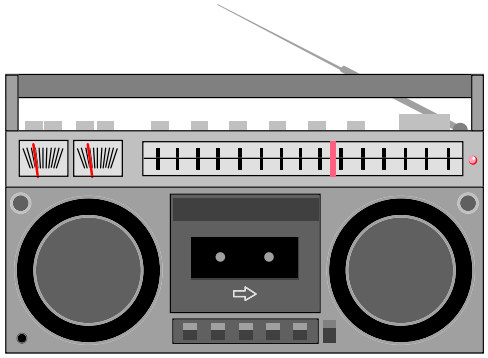
http://www.mwra.state.ma.us/water/html/awqr.htm

Knowledge about drinking water is based upon...



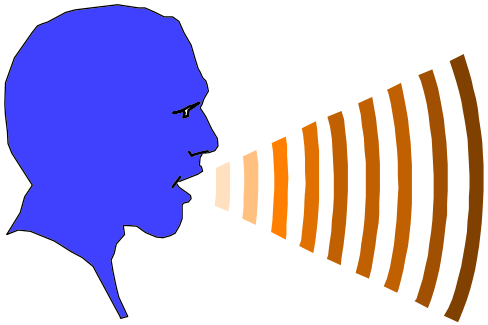


Fernando Q. Public



Radio

Friends



What does the public think or know about public drinking water?

- "It's inexpensive, and shouldn't cost much." Treated as a commodity, not as an essential.
- "Taste and odor is more important than safety, since all drinking water is safe." Public has gotten used to safe and dependable drinking water, and cosmetic concerns are paramount to some.
- "Drinking water isn't as good as bottled water." Assumes bottled water is different from tap water

What do consumers want to know?

- **Safety.** Is my water safe? How safe is safe?
- **Where** does my water come from?
- Will my water be **safe in the future?**
- How can my water be **protected?**

Addressing these can foster:

Community action

Local utility involvement

Individual efforts

Partnering with

Environmental Groups

DO NOT WAFFLE on SAFETY

- Safety - *is it safe is the key question everyone asks. Yes / No desired by some.*
- For a variety of endpoints - infections with new emerging pathogens, malignancies, adverse reproductive outcomes, and other outcomes - the **risks are uncertain** and vary for different groups; water community is at risk of delivering mixed messages.

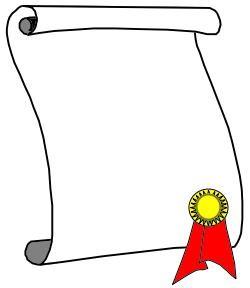
DO NOT MINIMIZE RISKS

NEED TO DEAL WITH UNCERTAINTY AND RISKS

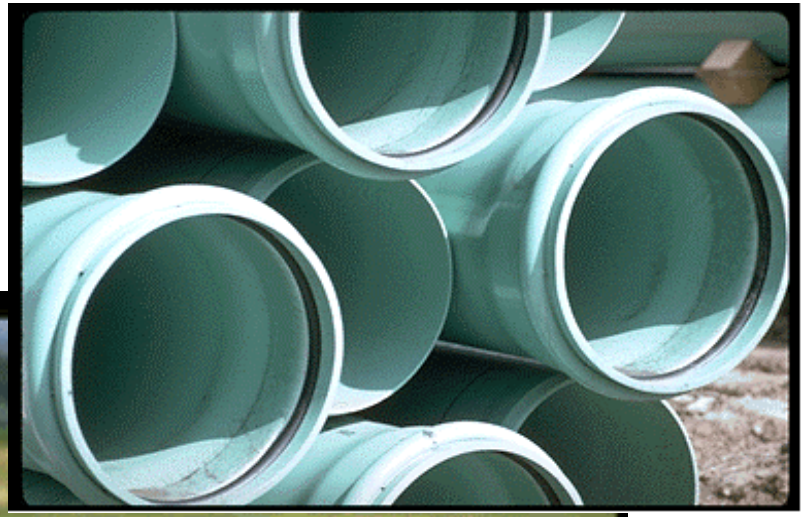
- Some groups deal with uncertainty all the time, such as health care providers: obtaining their support can really help with this *cultural* issue in *risk communication.*
- Certainty may be an economic advantage: communities with excellent water may be able to market this.

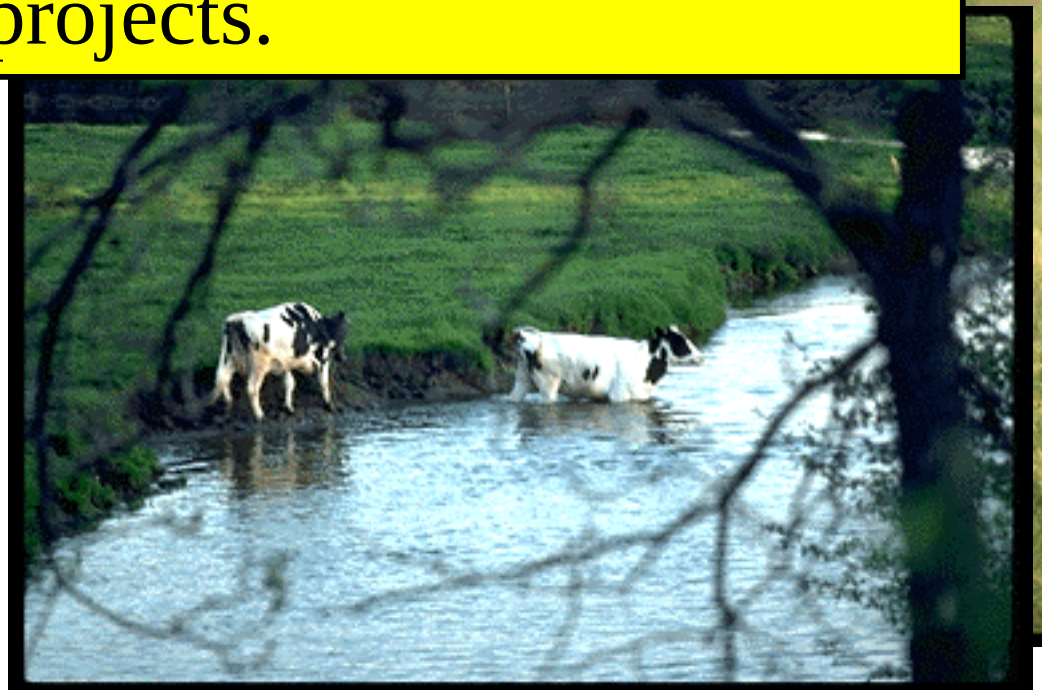
What is the Source of my water? Issues of Quality, Quantity

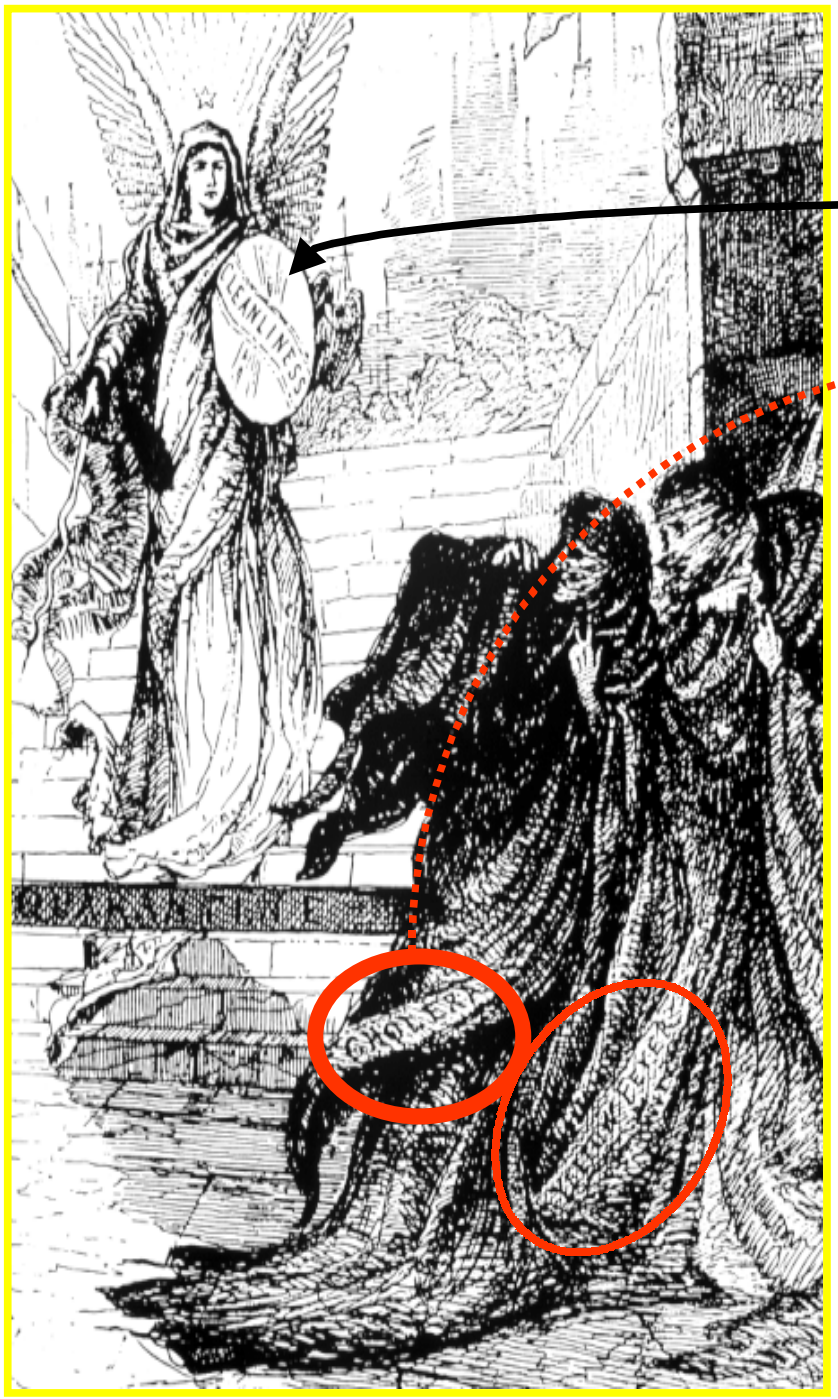
- Many people do not know where their water comes from, and what threats it may be under, unless water is already scarce.
- Many authority figures, (e.g. health care providers), are not more knowledgeable than the general public; cuts across all groups.
- Opportunity to discuss *Quantity*.



Increasing dialogue around source waters will increase the pressures for protection. Can be used as a way to gather community support for (expensive) protection projects.



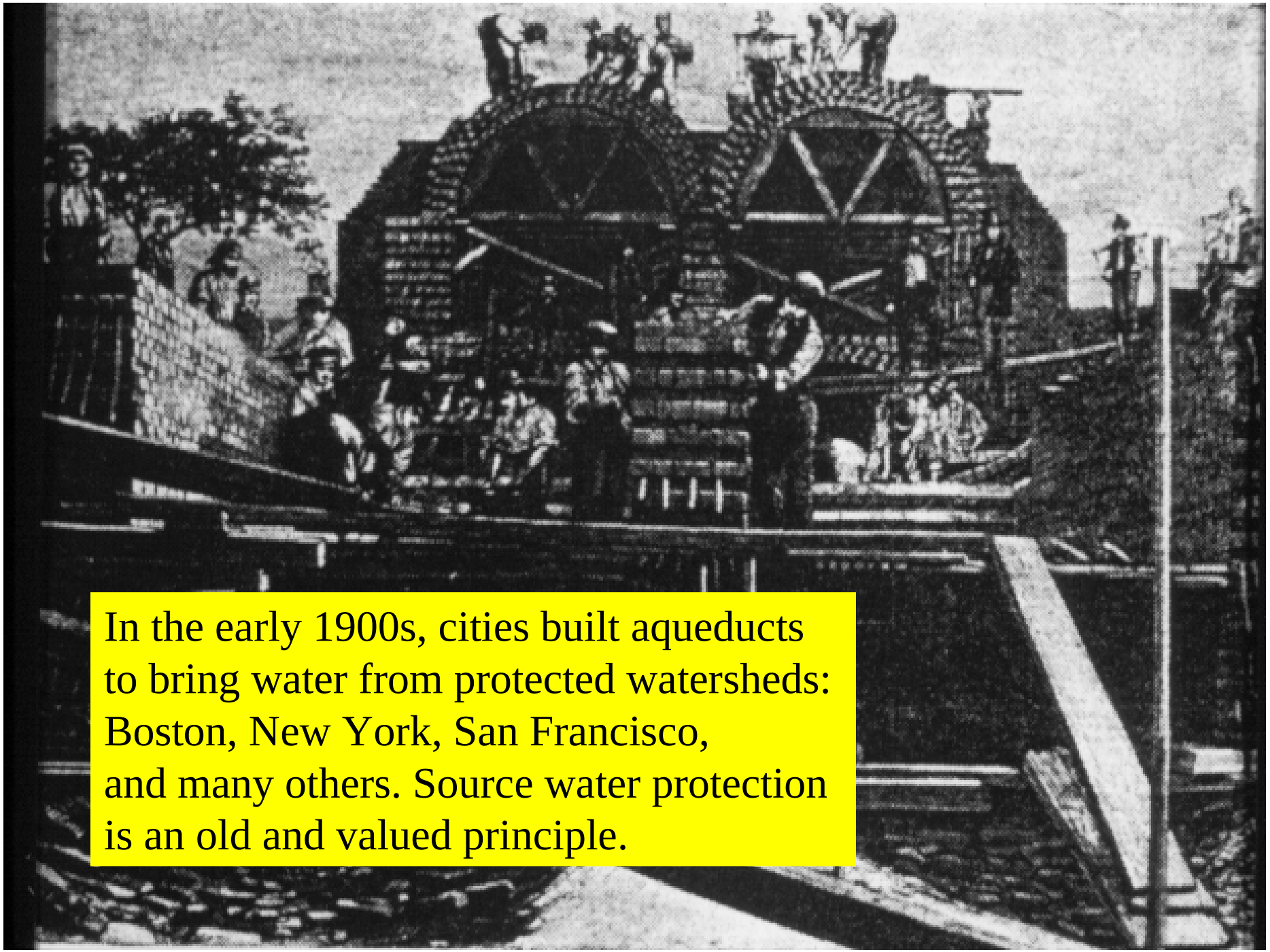




"Cleanliness"

Cholera and Yellow Fever

In 1900, people understood the importance of clean water from daily experience and banded together to do the "right thing." One senses an emerging consensus for **source water protection**.



In the early 1900s, cities built aqueducts to bring water from protected watersheds: Boston, New York, San Francisco, and many others. Source water protection is an old and valued principle.

Public involvement may promote tax law and regulatory changes which favor source water protection, stewardship, and conservation

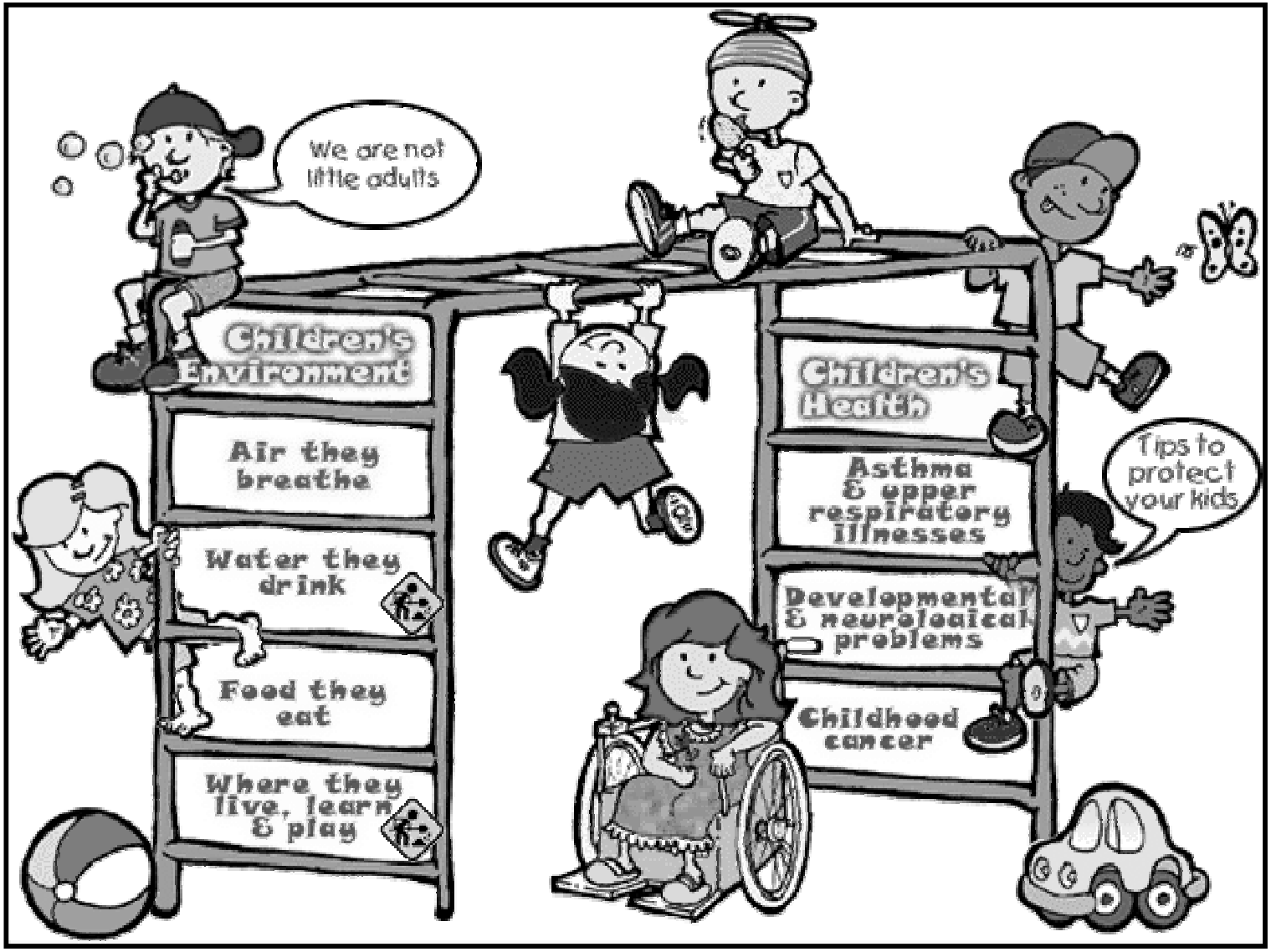
Remember the infrastructure needs!

KIDS: Recognition of Sensitive Subpopulations

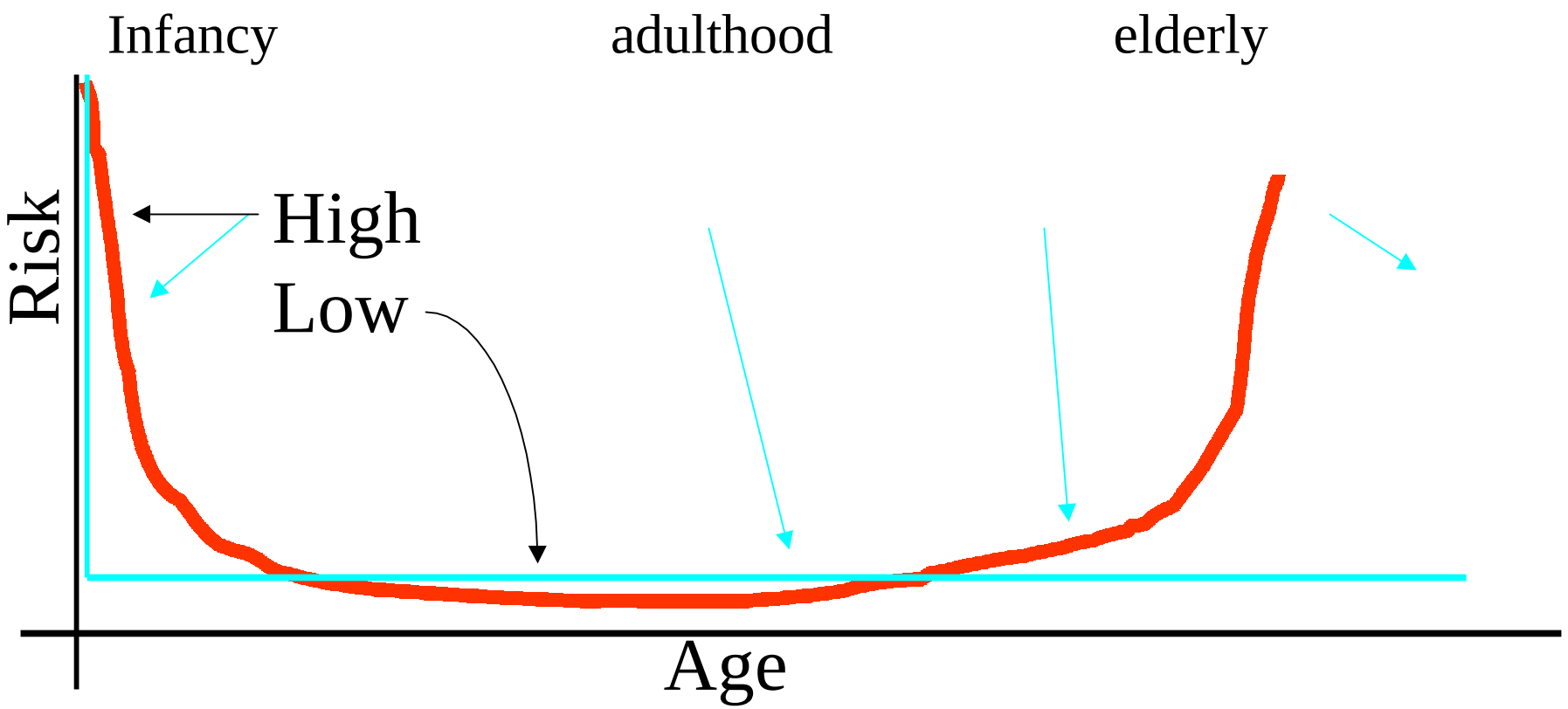
- Recognition that children as a population are especially sensitive to environmental contamination
- Reflected in EPA's cross-cutting advocacy for children

EPA's Office of Children's Health Protection

http://www.epa.gov/children/

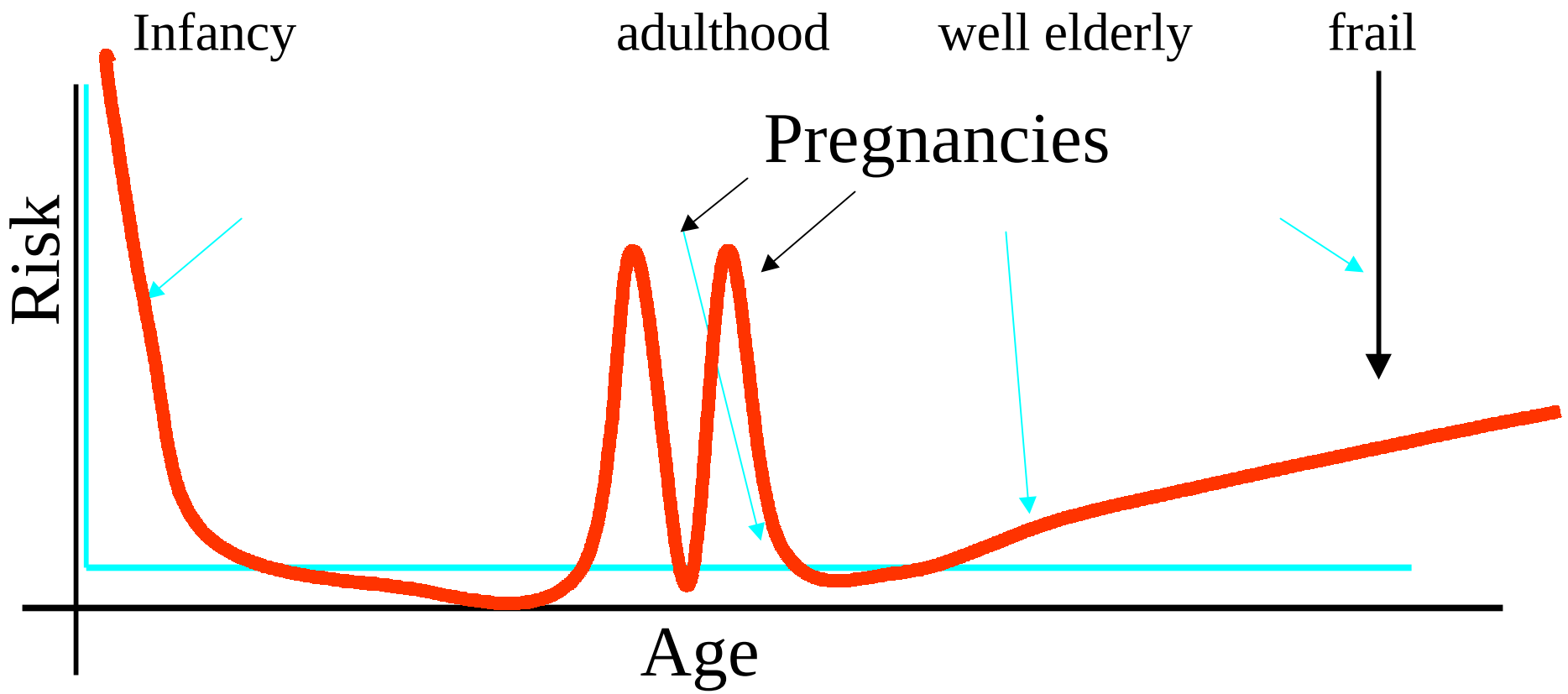


We're all a little at extra risk… the traditional view



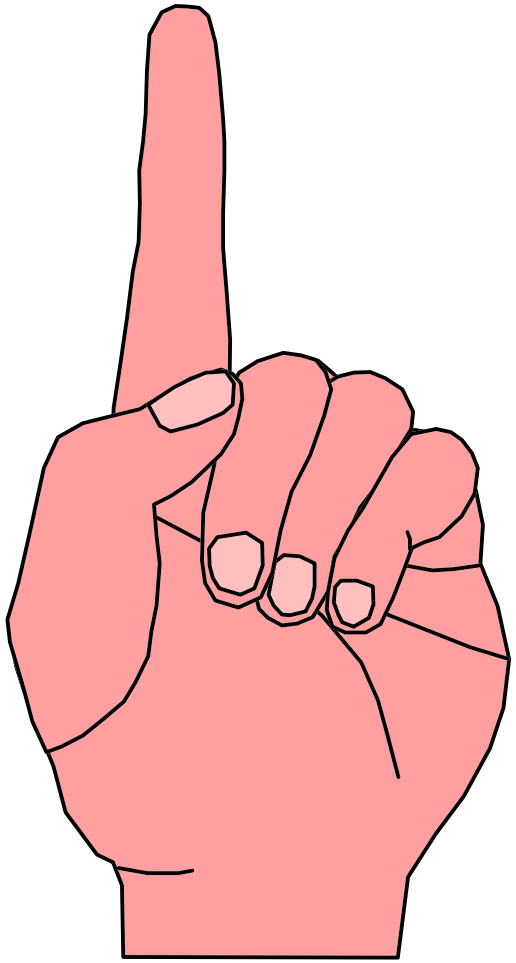
Ill people are living longer

We're all a little at extra risk… another view



Health Education Materials are provided in CCRs for:

- Lead
- Arsenic
- Nitrates
- Where these contaminants are detected at levels $\geq$ 50% of the EPA standard



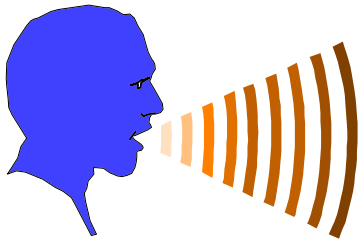
Right to Know: Target Specific Audiences

- General public
- Watershed dwellers
- Vulnerable sub-populations
- Children and Youth
- Health Care Providers
- Water Suppliers
- Private Well Owners
- States
- Local Governments
- Tribes
- Educators
- Students of all ages
- Parks and Recreation Departments
- Agricultural interests and land owners

Some are hard to reach, some are easy to contact

Yearly CCR

Non Profit or Industry Sources of Information



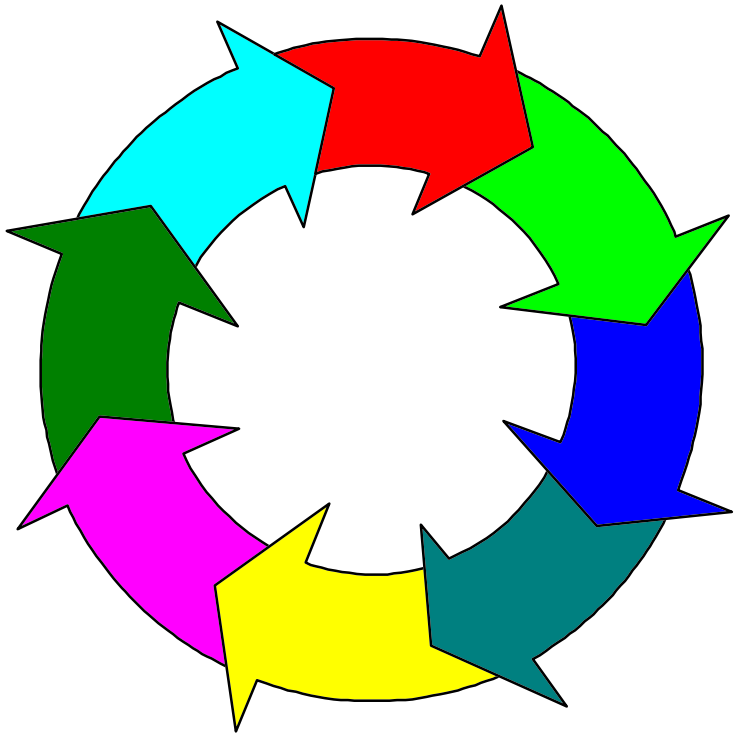
Fernando Q. Public

Health Care System

EPA United States Environmental Protection Agency

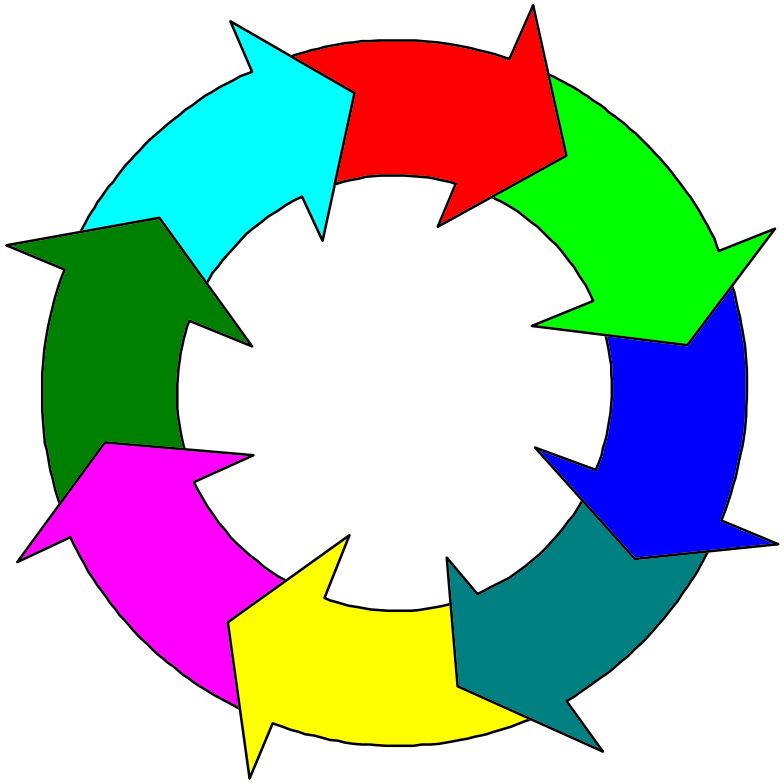
Changing perceptions

- With CCRs and other forms of dialogue, *citizens can become allies* of the drinking water community - no longer existing as just "victims" of safety concerns or of increased costs - through dialogue become independent actors

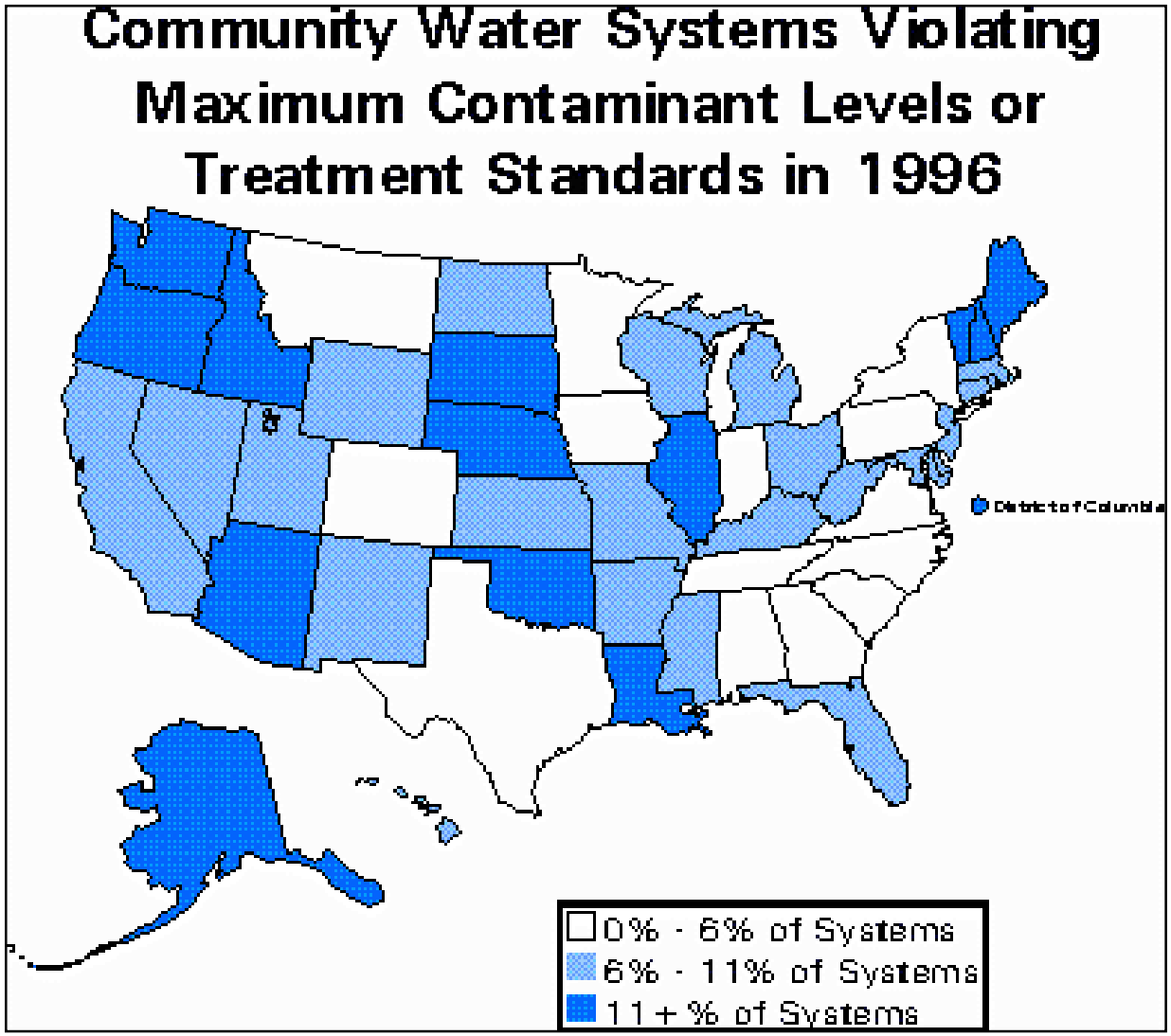


Communicate effectively

- Implication: You need feedback from the target groups
- Implication: You are responsive



Transparency to the Public



http://www.epa.gov/OGWDW/wot/howsafe.html

Tools to deliver messages:

- Use different languages for different target groups
- Be effective for the target audience: culturally savvy
- Reflect appropriate literacy levels

Use multiple pathways to deliver messages

Paths

- Internet: EPA, CDC, other interest groups have information on their web sites.
- Utilities can provide local information
- Radio, TV, Videos, CDs, Print
- Schools!

- Motivate others to provide other paths: health care providers, national organizations that represent specific populations, local environmental groups...

1996 SDWA- Training and Education

- "The Director and the Administrator shall jointly establish a national health care provider training and public education campaign to inform both the professional health care provider community and the general public about waterborne disease…shall seek comment from interested groups and individuals… scientists, physicians, state & local governments, environmental groups, public water systems, and vulnerable populations."

Health Care Providers

- Independent, seen as authority figures by the public, and have direct frequent contact with many subpopulations at risk.
- Often just as ill informed as the general public about drinking water issues.
- Very diverse, different groups may have different views on the same information.

Working with some groups is like herding cats

- Divergence of opinions
- Accountable to a different group of stakeholders than those of the EPA
- Brings in outside perspective

Some cats bite, and some cats purr. No guarantee that other groups will agree with EPA.

Health Care Providers - potential allies in education

- Busy and inundated
- Usually focused on the individual, not a population, so providing them with information about an *individual's* risks plays to this focus
- Poorly trained on environmental issues in school
- Deal with uncertainty every day and make decisions nonetheless

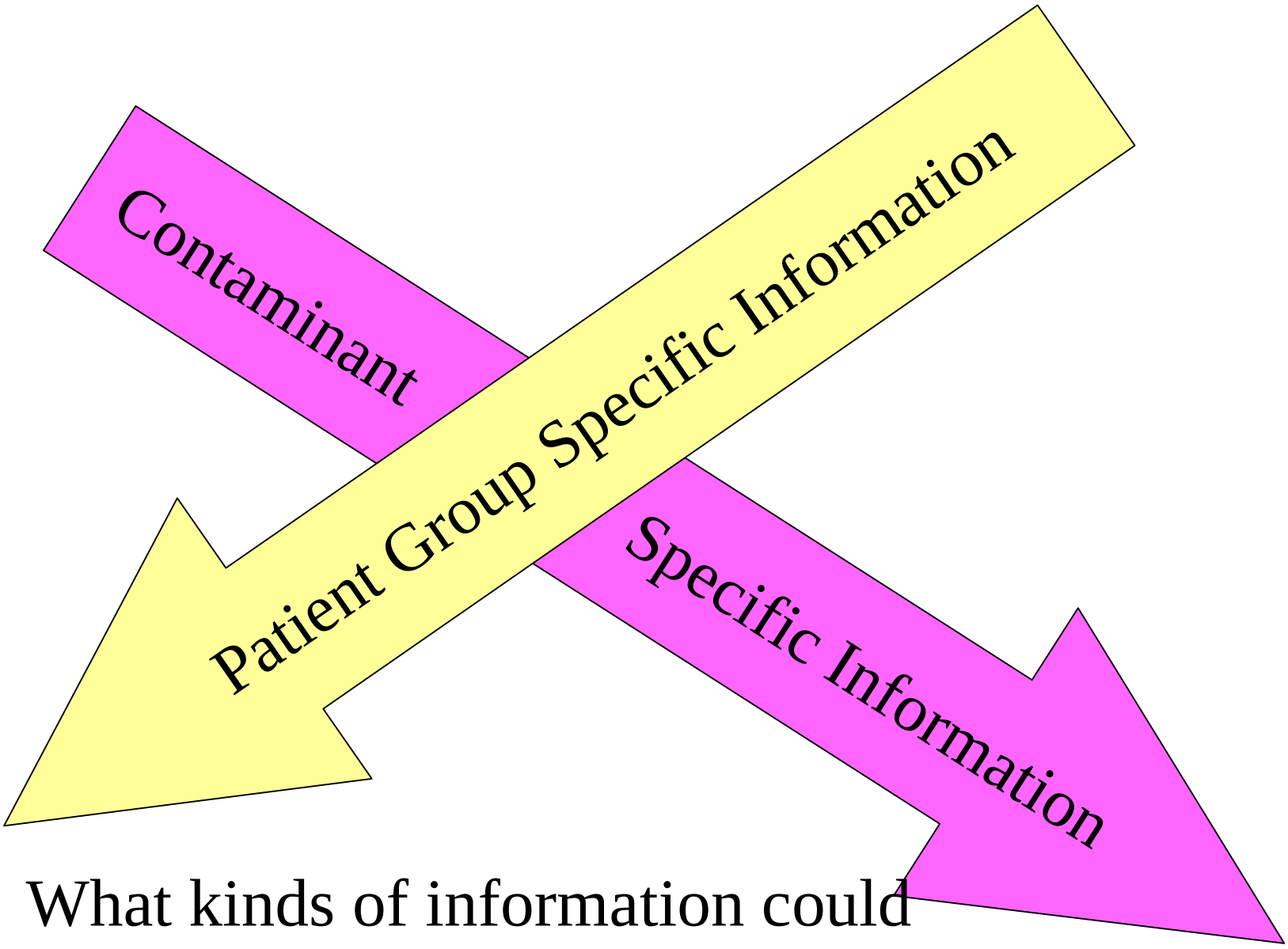
CDC and EPA should inform and educate HCPs in efforts to:

- (1) Counsel persons about the quality of the drinking water
- (2) Recognize, report, treat, and prevent adverse health effects from infectious and non-infectious agents that could be acquired from drinking water

*NDWAC HCP Working Group Mission statement

Who are some of the sensitive?

- People with AIDS
- Infants & young children, pregnant women
- People on chemotherapy or other immuno-suppressive medical treatment (steroids), on dialysis, have had a transplant
- The frail, poorly nourished, chronically ill
- Substandard care, the poor, limited access
- *People with genetic dispositions, as yet not understood, to specific diseases or malignancies.*



What kinds of information could be useful to HCPs?

What kind of information will HCPs have access to?

- EPA, CDC, and other “official” information
- The medical literature
- Information provided by interest groups
- Some information will be peer-reviewed, some not; early or preliminary data will be used by HCPs in topical areas when there is an absence of definitive information
- Decisions will NOT be based on consensus.

How to strengthen linkages with HCP Networks

- Engage leadership of key national HCP organizations
- Participate at National and Regional meetings; organize speakers' bureaus
- Provide input on 'Fact Sheets' for offices
- Distribute information via direct mailings, society web pages, newsletter inserts, special sessions at national meetings

Suggested Near Term Activities I

- Prepare concise, patient group specific information packets
- Add HCP information to EPA/CDC web
- Conduct ‘needs assessments’ of targeted HCP groups to see how to best reach them
- Pilot a variety of HCP outreach and education projects
- Routine coordination between water professionals and HCP organizations

Suggested Near Term Activities II

- Increase participation of drinking water specialists at national, regional, and local HCP meetings and workshops.
- Provide training materials for HCPs
- Provision of initial educational projects and formation of task forces to plan for long term HCP education needs
    - establish a group of HCPs to provide feedback and evaluation on initiatives

Suggested Long Term Activities

- Educational curriculum must be augmented to include more information on environmental health
- Partnering with other groups
- Enhanced continuing education efforts
- Enhance *standard* reference materials
- Advisory bodies to oversee curriculum integration
- Provide environmental health internships

We all have to drink water.

- If there is anything in public drinking water that is harmful, the exposure is universal - *everyone has to have water*. Thus the public health “lever” is large - small improvement can lead to major benefits.
- The provision of clean water and adequate sewage led to two-thirds of the increase in lifespan (20 of 30 years) in the US over the past century.
- For most people, under all but extraordinary conditions, public tap water is safe and healthy.